The Madras Forest College Magazine.

Vol. XX. JUNE 1936. No. 4.

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THE

Madras Forest College Magazine.

(PUBLISHED QUARTERLY).

Vol. XX. JUNE 1936. No. 4.

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College day, Madras Forest College, June 1936.

The distribution of prizes and certificates to the twenty third batch of students trained in the Madras Forest College took place on June 27th 1936, the concluding day of the "Forest College week." His Excellency the Honourable Rai Bahadur, Sir Kurma Venkata Reddi Nayudu Kt., Governor of Madras presided over the function. The students of the College furnished a guard of honour, which, His Excellency, and Mr. T. A. Whitehead, the Chief Conservator, inspected.

Mr. P. W. Davis, the Principal opened the proceedings by addressing the gathering as follows :—

Your Excellency, Mr. President and Members of the Board of Visitors, Ladies and Gentlemen:

"This is the third year in succession that we have been privileged to welcome the Governor of Madras to this College to preside at the Prize Distribution. I can assure you that we are not usually so fortunate. More than that, I would add that we feel particularly gratified this year at the happy

coincidence which enables us to greet you, Sir, not only in your distinguished office, but personally as one who has taken an exceptionally close interest in our Department and who already knows a very great deal about us from past association. We realise too, that at the present time Your Excelleney's visit must be regarded as a very great favour, for which wc thank you.

"I am glad to be able to inform you, Sir, that this present building has come of age this year, being completed 21 years ago. The College has had vigorous adolescence and I sincerely hope that it has yet far to go before senility is anywhere apparent. Various changes have taken place in the past, and we are about to undertake further departures in the near future. The first thing that might strike the visitor to this College is its spaciousness. It stands in 198 acres of ground; it possesses a very good playing field and a very interesting Museum. The field of practical studies extends over five forest districts at present, and the number may be greater in future. We are therefore not cramped for space. Yet the College is designed to accommodate no more than 60 students and at the present time only 37 students are in residence, the smallest number for a great many years. In point of view of numbers it is quite possibly the smallest College in India. Spaciousness however, is a necessary condition of a forester's life and training. The total forest area belonging to the State in the Madras Presidency alone is 15,652 sq. miles. Private forests are comparatively insignificant in extent. In all civilised countries the State has recognised a `duty in protecting its forests from devastation and in utilising them to the fullest possible advantage, for which purpose a State forest service is organised. In India the forest ranger fulfils an indispensible function, being in charge of the principal executive unit of control — the forest range, and (like his non-gazetted counterpart in the British Army) he is the backbone of the service. A forest ranger may have to protect and manage as much as 100,000 acres of forest, scattered

perhaps over a much larger area; his duties are to maintain the forest boundaries, to prevent fires and thefts, to control grazing inside the forest, to collect revenues, to construct roads, and bridges, build forest quarters and rest-houses, survey and assess large areas, plan and estimate for the felling and extraction of timber (often in difficult localities) to prepare nurseries and to regenerate the crops which have been felled, by every resource at his command; he must also be versed in the legal aspects of his profession for he must be prepared to conduct the prosecution of cases in court, and he must maintain numerous registers and accounts, generally with the aid of only a single clerk. Above all he must be able to keep himself fit, for unless he is active in seeing all parts of his charge, he cannot expect to control his subordinates or to perform his own duties satisfactorily. Thus although his activities are rarely in the public eye, he is not the least important member of the community.

"The College has to turn out men trained in these diverse and strenuous duties in the course of two years. Naturally, the number of vacancies which annually occur in the ranger cadre are not numerous and openings for rangers in private employment occur exceedingly rarely. But I trust that I have said sufficient to indicate, Sir, that our importance is not entirely to be reckoned in direct proportion with our numbers.

"A criticism which is sometimes made of this College is that we make it very difficult for students to get in at all and thereby discourage many. The fees are accordingly high as compared with those of other educational institutions. But since the Governments of Madras and other Provinces prefer to select their men before they come to the College, it is necessary to warn intending private students that we can hold out no assured prospect of employment after they leave the College unless they have some prior offer. I think that everybody will agree that this is the preferable course to pursue; hitherto we have had no army of demoralised ex-students. I do not know of a single student who has not obtained employment soon after completing the course.

"Up to this year, students deputed by the Madras Government have been chiefly drawn from the ranks of foresters already in service. The system is now to be changed. Government consider that the assurance of a good post is a factor to be recognised and that intending candidates for a range officer's post must be prepared to pay something for their training. Successful candidates will be required to undergo a period of probation for four years, the second and third years of which will be spent at this College, for which they must pay tuition fees of Rs. 750/- a year. During the first and fourth years, these "Forest apprentices" as they are to be called, will be paid a maintenance allowance, although in the fourth year there may occur opportunities for them to act in leave vacancies for which they will receive the pay of the lowest grade of range officer. This is entirely a new departure, and must therefore be regarded as something of an experiment Two scholarships will be awarded annually to members of the backward communities, which will include free tuition and a stipend of Rs. 35/- per month towards College expenses The conditions governing the admission of students from outside Madras Presidency remain unchanged. If the scheme is successful in attracting the right kind of candidates, it should enable this College to be run for the first time without any loss to Government and we shall presumably no longer be flatteringly termed a "white elephant".

"I come now to make my report on the year's work. The staff remained unchanged with the exception of Mr. Woodhouse Adolphus who went on leave last July : his place as 2nd Senior Instructor was taken by Mr. R. H. Mitchell. Mr. Mitchell is not new to the College, having been an instructor here some years back, and his past experience has been valuable. Apart from the Principal, the instructional staff number only three gazetted officers. This is the very minimum number necessary and it allows no instructor to fall sick or take leave for more than a few days without throwing the syllabus out of gear. The Principal is compelled to devote himself most of his

time to the Senior Division and his visits to the Junior Division camps are necessarily of extremely short duration. I consider this circumstance does not permit the Principal to fulfil his proper function, and the arrangement is not in my opinion an ideal one. But while considerations of economy continue to be paramount I have of necessity accepted the present situation.

"We have had in all 37 students, 17 in the Senior Division and 20 in the Junior Division. Of these, 13 are Madras Government students and 3 are private students accepted at concessional rates which hereafter cease. The remaining students come from Bombay Presidency, Hyderabad, Travancore, Central India States and Ceylon. We expect next year 25 students of which 9 will be from Madras.

" The Senior and Junior Divisions tour separately each for about five months in the year. The Seniors, with the Principal and the 2nd Senior instructor camped at Walayar (in Palghat Division), Nedungayam (in Nilambur Division), Aiyur (in North Salem Division), Bangalore, and Arambyshola in Ootacamund. All these camps were most satisfactory and the health of the students has been above average. The Bangalore camp, which was an innovation two years ago, has again convinced me of its value. The instruction is given by Army officers in a very efficient manner and the programme is arranged to cover as much as possible of the practical field engineering and pioneer work which a ranger should know. The Juniors with the 1st Senior Instructor Mr. Abdul Ali Khan and the Junior Instructor Rao Saheb V. N. Seshagiri Rao toured in Sadivayal (Palghat Division), Mount Stuart (South Coimbatore Division) Kargudi (Nilgiris Division) and Bandyshola, near Coonoor. The Junior camping programme was upset first by the drying up of water supplies and subsequently by much ill-health due to malaria contracted at Mount Stuart camp. The Board of Visitors have been considering the question of making some alterations in the Junior camping programme.

"The original college syllabus which was drawn up very carefully has now been revised in the light of experience gained, after consultation with the Chief Conservator of Forests and with the President of the Research Institute and College at Dehra Dun where the rangers of North India are trained. Modern trends have not been neglected. In Silviculture, for instance the importance of a knowledge of the foundations of ecology and soil science is recognised, and this involves considerable addition to the lecture syllabus as well as in out-door work. The Board of Visitors decided last year that Natural History, that is, the habits, as well as the recognition, of the living animals of the jungle, should be taught, somewhat as an informal subject, and chiefly in the field. The subject, is not without its special difficulties in practice. However, a start has been made; and what is also necessary, we have endeavoured to create an interest in the beauty and importance of animal life, the very survival of many species of which will depend in the future very largely upon the efforts of the Forest Department. It would be a matter of great interest, I am sure, to all forest officers if a natural history section could be opened in our College Museum, not only for our own use but as an education to the public. In a country of such world-renowed variety of fauna, it seems to me a matter for regret that museums exhibiting them are so pitiably few and ill-stocked. The proper setting up of specimens cost money however, and as everybody knows, money is hard to find. The trophies which have been kindly lent to the Museum by forests officers are certainly very much appreciated, and help considerably but they do not constitute what I mean by a "natural history section"

"One other matter I must remark upon in passing. Last year I reported that I had secured the much appreciated cooperation of certain lecturers in the Agricultural College adjoining, in the delivery of one or two special lectures upon such things as insects, fungi and soils. By coincidence, suggestions have since been raised in public that this College

Syllabus is deficient in the instruction necessary to rangers, particularly in entomology, mycology and geology. Actually these subjects are not overlooked but are accorded their proper measure of importance in relation to the forest itself. They are not taught as separate academic subjects, which would be quite out of place in a course strictly regulated to the requirements of forest rangers. I have not renewed my request for assistance from the Agricultural College this year because I think it inappropriate to solicit the time of those officers to give lectures and demonstrations demi-officially and the staff of this College is in fact quite capable of imparting essential instruction. The question regarding supplementary instruction is being examined by the Board of Visitors.

"More attention has been devoted this year to practical work in the various camps, particularly by the Junior Division in Silviculture, Engineering and in the surveying of hill roads. Practical examinations were held as usual in camps and the previous standard was maintained. Various public works and places of instructional value both near headquarters and in the districts were visited and the courtesy of those in charge in permitting us to go round is gratefully acknowledged.

"I remarked earlier upon the importance that is attached to a healthy physique, and for this reason physical training and games are part of the curriculum. The average physique of the students within recent years does not come up to that of former years. The standard I think ought not to depreciate further. Hockey, cricket, football and tennis are played at the College and in camps where facilities exist. Although the cricket team is a little better than last year the eleven is drawn almost entirely from the Junior Division and we had little chance to get together before the Y.M.C.A. tournament in which we failed to reach the final. We were unable to enter the Hockey Tournament as camps interfered.

"Generally speaking I think we could improve in games if captains of teams would realise that loose practice games are

a waste of time; captains must take more upon themselves than they do at present. I look forward next year to getting more thinking applied to each practice game, and much of this has to be done in advance. The smallness of our numbers and the fact the best players are often in more than one team is not of course favourable to serious organised practice in the short periods available at headquarters.

" The Annual Athletic Sports were held at the College on the 26th October last and the programme was successfully carried through. We much appreciated the large attendance of friends. Three more College records were broken: the High Jump at 5 feet $1\frac{1}{2}$in., the Shot put 30 ft. $\frac{3}{4}$in., and Javelin Throw 119 ft. $7\frac{1}{2}$in. The Richmond Cup was won by Senior student T. J. Abraham. The College entered for the Coimbatore Olympic Sports which is open also to surrounding districts. Student Abraham received the Rajah Olympic Medal for the greatest individual total score. The College was beaten by a team of the Kings Own Royal Regiment from Wellington by just 4 points in the competition for the Aggregate Cup which I think was satisfactory performance in view of our small entry.

Swimming pratice was held at Nedungayam for all Senior students. The annual race was held here as usual, which Abraham again won easily.

" The annual cross-country race over 7 miles of country was held at the close of February last, There were 30 competitors. Senior Student Sivaramakrishnan came in first winning the Ramarajah Mannarghat Moopil Nair Cup. The Senior Division won the Inter-divisional Cup for cross-country running.

"The College Library contains well over 4,000 volumes of technical and general interest and 61 books were added during the year. There is unfortunately no proper Librarian and a subject-index for the proper record of forest literature is a desideratum.

"The Gass Forest Museum continues to attract the public and there were 38,983 visitors during the year.

"I now come to the results of the examinations. 17 students sat for the final examinations; of these one obtained an Honours Certificate, having obtained over 80 per cent of the total number of marks during the course and at the final examinations; 13 obtained the Higher Standard Certificate, and 3 obtained the Lower Standard Certificate. The class average of marks obtained in the final examinations conducted by outside examiners is 66 per cent and for the whole course, 70 per cent. As a result of the examinations in First Aid 17 students receive the Certificates of the Saint John's Ambulance Association.

"The Junior Division show good promise for the most part although there are two or three students who find difficulty in following the course, partly owing to a deficient knowledge of English.

"To all departing students I wish very good luck and a successful future. I trust that they have enjoyed their time here and will remember at least something of what they learnt when they find themselves Rangers.

"I again thank you, Sir, for so kindly consenting to preside with us to day.

"I now ask His Excellency, the Governor, to present the certificates and prizes :—

Madras Ranger Honours Certificate.

1. N. Sreedharan Pillai.

Madras Ranger Higher Standard Certificate.

2. K R. Radhakrishnan.
3. T. J. Abraham.
4. K. P. Cyriac.
5. N. Ramakrishnan.

6. B. M. Bopayya.
7. P. Balakrishnan.
8. P. Gopala Menon.
9. S. Natarajan.
10. L. R. Sharma.
11. J. P. Cherian.
12. C. J. Nanjappa.
13. P. S. Sivaramakrishnan.
14. M. Sadasiva Reddy.

Madras Ranger Lower Standard Certificate.

15. M. Z. Kuraishy.
16. S. I. Hussain.
17. Muhammad Ali Khan.

List of Prize-Winners etc :—

S. No.	*Name of Prize.*	*Student who obtained it.*
1.	Gold Medal for the Senior student on marks ...	N. Sreedharan Pillai.
2.	Silver Medal for Honours ...	N. Sreedharan Pillai.
3.	Campbell Walker Prize for the best student in Forestry...	N. Sreedharan Pillai.
4.	Lodge Prize for Engineering.	N. Sreedharan Pillai.
5.	Brazier Prize for the student likely to make the best outdoor Ranger	B. M. Bopayya.
6.	Madras Conservators' Prize for Survey and Drawing ...	K. R. Radhakrishnan.
7.	Madras Conservators' Prize for Botany ...	N. Sreedharan Pillai.
8.	Madras Conservators' Prize for Range Administration ...	K. R. Radhakrishnan.
9.	Chief Conservator's Prize for the best Junior student ...	B. D. Nadkarni.

10.	Indian Forester Prize for an essay by present student ...	P. S. Sivaramakrishnan.
11.	Indian Forester Prize for an essay by past student ...	T. D. Ponniah.
12.	Richmond Cup to the student obtaining the greatest number of points of the more important events at the College Sports ...	T. J. Abraham.
13.	Pentland Shield for the all round Athlete ...	K. Dileep Sinh.
14.	Fischer Cup for Tennis ...	P. K. Patnaik.
15.	Mannarghat Moopil Nayar Cup for Cross Country race ...	P. S. Sivaramakrishnan.
16.	Cowley-Brown Cup for Inter-divisional Hockey ...	Junior Division.
17.	Swimming Medal. ...	T. J. Abraham.
18.	Vira Pam bhoi Football Cup ..	Senior Division.
19.	Winner of the best essay in the Madras Forest College Magazine for the year 1935—1936 ...	P. S. Sivaramakrishnan.

His Excellency then addressed the gathering:

He referred to the work of the Forest Ranger in the forest, the nature and responsibilities of his service, and pleaded for the human touch in the working of the departmental machinery.

He added that on an occasion like that, before he referred to the speech made by the Principal of the College and to certain of the criticisms that were levelled against the College and the Forest Department, he thought it was his duty first to congratulate the students of the College who had passed their examinations and had won their prizes which had been distributed to them just then. One thing which he noticed as

he was entering the college was the excellent physique of all the students who were standing when he was entering. He must congratulate the Principal on this aspect of the college life which extended to the health and the physical strength of the students. He would have occasion presently to tell them that they needed all the strength and all the learning that they had gained in the college. Their Principal was telling a little while before or rather expressed the hope that the students might retain some of the knowledge which they had gained in the college. He would tell him that his experience had been that while the knowledge that they had gained in this college was really good, that which they gained in the field and the forest would certainly be better.

Forest Experience.

The Principal was referring to the interest which he (speaker) took in the forest department and the work in the forests. The Principal was perfectly right there. He could legitimately claim to have devoted a certain amount of attention to this department, in particular along with another, viz., electricity. His friends present would bear him out when he reminded them of the trials they had in the forests of the East Godavari district of the northern division when he along with the Conservator and the District Forest Officer had to traval almost to the extreme boundary of the presidency where their cars had to be dragged across streams and where they had to take their lunch under a leafless tree. But it was still a great pleasure to have had that long tramp and one was reminded of the beauties described by Valmiki of the forests which gave rest to the great heroes of their country, Sri Rama and his brother Lakshman. That was the forest which they had to roam about for about five or six days. He had equal opportunities of seeing their forests in the South Kanara district where he supposed the troubles of the Forest Department were more than in any other place. He thought these two instances sufficed to justify the statement made by the Principal that he, the speaker, took some interest in this college and in this depatment. And if to-day he made

some remarks concerning the working of this department he was sure they would be received in the spirit in which he was making them.

The Personal Element.

In the first place, continued His Excellency, they were probably aware that they, the students, were entering the department or were already employed there but their services would be in these forests. Public criticism was very often levelled against this department more than perhaps against any other department. The fact was these critics did not enter these forests. They did not realise the difficulties of the officers of this department and his young friends who were entering them must be prepared to face such criticisms themselves. The public did not realise that the officers were entering a department where work was confined mostly to the interior of these forests, most of them inaccessible, some infested with malaria, not to speak of wild beasts away from civilisation, and associated with aboriginal tribes. The difficulties these people had to contend against were not realised by those outside.

Unfortunately these criticisms started with the villagers who had not any idea as to why Government had this forest department costing about 38 or 39 lakhs of rupees every year and placed restrictions upon them. Probably the villager would be very grateful to them if they allowed his cattle to graze without paying for it and if they allowed all the drywood, probably even the cut wood, to be removed for the purposes of fuel. But the speaker when he said all these things did not mean to say that the officers of the Department, should be very strict with these people, that they should look only to the revenues of the forests, that they should look to the rules that were placed in their hands and that they should look to the encomiums and praise which they might get from their superiors. What he would suggest without in the least imputing that such qualities were not available now, was that they would have to bring into their administration an element of what might be

called humanity, the personal element, the association with the villager, some sympathy with him while they were perfectly right in enforcing all the rules that might have been entrusted to them for execution. That would be his request to them, the Rangers, who were going out and who would be entrusted with those arduous duties.

Forests as National Assets.

The trouble with this department was that the public outside did not know that forests were a national asset, that by maintaining and improving these forests they were assisting the agriculturists of the villages in the plains, that they were helping in the retention of the moisture of the soil by increase in the rains and of ever so many advantages which forests alone could give to the agriculturists. Not knowing that and thinking that these forests were there for nothing and that every facility should be given to them they raised these disputes, these references to Government, with which the officers had to deal. He hoped that when the students went to these forests as officers while they conducted themselves in strict accordance with the discipline that had been taught to them here, they would also remember that the villager needed their help and their service.

They in this respect indeed were very fortunate in that they had as the Principal had pointed out, something like 16,000 square miles of forests in this land. And a great many things were possible if they were filled with enthusiasm and assisted their superior officers. As had been pointed out in the report by the Principal they were the backbone of this department. There were higher grade officers no doubt but still the initiation was with them. And here in these forests there were many things about which he had often talked to the Chief Conservator, of the possibities of introducing a new kind of wood, for instance, in the case of pencils or for matches or wood for the purpose of making paper, a number of other things which had to be developed and which would be a great

resource to the industrial development of this country. It was not enough, if he might say so, for them to just look after duties. They would get promotion in the service. But they would be earning ths gratitude of the nation if they used their brains in trying to indroduce things which might not be present and which with the help of their superiors, if only they were inclined to help the people, they could introduce and improve. (Cheers).

Tribute to The College.

To the college he had nothing but praise. They had listened to the very interesting and instructive report from which they had very little to differ. He had already referred to the physique and the condition of the students' health which in itself was a great factor. especially having in view the duties they had to peform. Then he found also that the curriculum had been changed and some subjects which were not hitherto taught here were being taught at present.

The Principal was probably aware that many attempts had been made on several occasions to stop this college for at least temporary periods. From the year 1921 when the question was raised on the ground of the heavy expenditure incurred in this college, in the year 1931 when the Retrenchment Committee sat and when the department had been re-organised, again in the year 1935, proposals were made for closing this college temporarily for some period. Here again, he claimed some interest in their college for having tried his level best to see that such an unfortunate step was not taken. (Cheers). The Government had come to the right conclusion that this college should continue. It must be remembered that this college was not helping merely the students of their own province but students from Ceylon and from Northern India; in fact almost from every part of this vast country students were being trained here.

Mr. T. A. Whitehead, the Chief Conservator of Forests then made the following Speech —

"Your Excellency, Principal of the Forest College, Ladies and Gentlemen.

"In reiterating the welcome extended to Your Excellency by the Principal it is my privilege to say, Sir, how very pleased we are at Your Excellency's presence here today and to thank you for sparing the time to do us an honour which we greatly appreciate.

"We know how difficult it was for your Excellency to make it possible to accept our invitation after your promotion as Governor was known to you and we were delighted when in spite of everything you decided to stand by the Forest Department as you always have done.

"When attacks have been levelled against the work of the Forest Department you have defended our actions and you were enabled to do so because of your first hand knowledge of conditions prevailing in the forest itself.

"This intimate knowledge has enabled Your Excellency to realise that though our sympathies as yours, Sir, are with the hard lot of the agriculturists, as Forest Officers the forests too claim our protection. This understanding is vital to us in our constant efforts towards the future welfare of India.

"With the final examinations just held the Seniors will now pass on to their life's work in the forests. As the examinations, and their general behaviour at the College, show, they have a bright future before them. We have, from time to time during their practical work in the field and here at the College during the past week had opportunities of watching both the Seniors and Juniors at work and at play, and it has been satisfactory to note the improvement in physique and the cheerful frame of mind which they have acquired at the College : A most satisfactory result due to the admirable personal influence of the Principal and staff.

"On behalf of the Board of Visitors I have much pleasure in congratulating the Principal and the Instructors for the keen interest and industry which they have never failed to show and for the excellent results achieved. We also wish to express our appreciation of the work done by the Examiners who have willingly given their services, over and above their ordinary duties without allowances.

Many ladies and gentlemen have given much time and thought in connection with this annual function and have also provided for our entertainment and recreation during the week. My wife and I wish to thank them very sincerely for it all.

We are all very pleased that Daniel Richmond has been knighted. Formerly a mere jungleman like the rest of us, he has now moved to other spheres. A man of out standing ability great popularity and a sportsman, we wish Sir R. D, & Lady Richmond long life for selfish reasons, so that they may continue to cheer us with their wit & friendship in our old age. We much regret that owing to Sir Robert Daniel's indisposition they have been prevented from being present here today. We wish him a speedy & complete recovery.

Last year there was something said about health and it may seem hard to have to acknowledge that however fit one keeps one cannot always avoid getting malaria. We have for years undertaken control measures at our more feverish camps and labour settlements, but our ideas on control measures have recently received a rude shock by Dr Measham's research work at Valparai. He has clearly demonstrated that control measures which may be effective in one localty may be definitely harmful in another. The larvae of some harmful species of mosquitoes require stagnant water and shade in which to thrive, while Dr. Measham has now found that *Anopheles fluviatilis* requires slowly flowing water exposed to sunlight in which to mature, and this species exists also in the Wynaad, Mysore and Coorg. It seemed probable that it was the harmful one

in the rainfed forests of the Southwestern Ghauts, but Dr. Measham recently found at Anapady in the Anamalais that *Anopheles Culicifaces* was the culprit, thereby definitely demonstrating the wisdom of his maxim that every malarial problem is a local problem. It is evident that we require expert advice on the control measures necessary in the diffierent types of forests throughout the Presidency, for without it in our ignorance we may conceivably drain a feverish looking swamp and thereby actually create an ideal breeding ground for the very species of mosquito which may be the most harmful in that locality. It is hoped that it will be possible to obtain for our needs the advice of experts trained in this extremely delicate and difficult investigation. Delicate and difficult, because it involves the microscopic examination of minute quantities of blood extricated from the internal organs of a small mosquito in order to find out whether the blood was sucked by the mosquito from a human being or an animal. This is necessary because some malaria carriers are harmless to man preferring the blood of animals, but may become harmful if there are animals to sting. Villagers often stall their cattle near and even inside their habitations. This practice may have seemed eccentric to some of us, but now we see that there is something to be said for keeping a cow in your bed room.

"This is the last occasion on which this annual function of ours is to be held under the present regime. We stand on the threshold of Provincial Autonomy and the Forest Departments in India will be provincialised, which so far as the Presidencies of Madras and Bombay are concerned is no particularly new departure from that which we have been used to in practice in the past. Although, however, our departmental establishment has for all practical purposes been provincial, we have kept in close touch with the Forest Research Institute at Dehra Dun, and some of us from time to time have been deputed to appointments at this Institute. This Forest Research Institute at Dehra Dun, the finest of its kind in the Empire is the pulsating heart of Forestry in India. Research

is as essential to the life and growth of Forestry as it is to the growth of all other sciences, to many of which Forestry is closely allied. It is also necessary in helping local enterprise to make full use of India's resources. I might give a few examples illustrating the importance of such research:—

"Before the Great War the imports of timber into India exceeded exports by Rs. 65 lakhs. Teak came to the rescue in larger exports at about double the prewar prices and turned the balance in India's favour, but since 1931 the balance has been on the decline owing to the worldwide financial depression.

"Under the heading of imported manufactured wood the bulk was in the form of matches of the value of some Rs 60 lakhs a year. Now the match industry in India meets practically the whole of her demand, but even so half the wood used is still imported, chiefly Aspen from the Baltic, the other half being now supplied by India and the Andaman Islands — the Andaman Islands sending some twenty thousand tons of of *Sterculia campanulata*.

"Another imported manufactured wood is plywood for tea chests and the bulk of the three million chests is still imported, but now two mills in Assam are making threeply chests though much headway has not been made in spite of a considerable duty on the imported material.

"As regards paper, the manufacture of woodpulp from indigenous timber has been under investigation for some time, but a large quantity is still imported. The Forest Research Institute evolved a satisfactory process for making bamboo pulp for paper and its use is being extended. It yields a high quality paper and this industry should have a bright future.

"The exports of Minor Forest Produce are of considerable value to India and by far the most important of these is lac. Lac is being used now for gramaphone records, electrical insulation, varnishes and polishes, but research officers are at work on its use in other directions.

"Under tanning barks research in Africa has recently shown that the production of wattle bark can be increased by a hundred per cent by altered methods of sylviculture but the applicability of these methods in India is a matter for research to investigate.

"Research comes first, then demonstration in the Provinces in co-operation with the different Research centres, and, finally local enterprise must be encouraged to have the knowledge acquired to commercial profit.

"With all these it is obvious that a Forest Officer's view must be a wide one. It is essential for him to maintain foresty intercourse not only on an inter-provincial and inter state, but also on an inter-national scale.

"A Forest Department completely boxed up within the watertight compartment of a Province cannot grow, it must stagnate and deteriorate.

"A Forest Officer must also take a long view, at times extending to hundreds of years ahead. Such a view is necessary in considering the provision and regulation of a country's watersupply.

"It is common knowledge now that the presence of forests is as essential to agriculture, as the two together are vital to the life and prosperity of a country. The importance to India of the proper regulation of the watersupply cannot be overstated. The virgin evergreen forests are the natural reservoirs and the ingenuity of man has not been able to improve upon nature. Man can build reservoirs but these are of a temporary nature. Eventually they will become silted up if not periodically cleared of silt at considerable cost and the more rapid the destruction of the forests the more rapidly will the silt be deposited. You have only to go into a virgin evergreen forest in a thunder storm to witness how wonderfully nature has arranged her natural reservoir, the three complete canopies of leaves, the upper, the middle and the lower storeys, to break the force of the

heavy downpour of water and allow it gently to sink into the soft receptive bed of leaf mould and soil from which a gradual and perennial flow of water is maintained.

"There is not a country in the world which having destroyed its virgin forests would not now give untold gold to have them back again.

"And now we wish the Senior students health and happiness in their future life. And in doing so I cannot do better than to urge them to try to follow the great example of devotion to duty set us by His Late Imperial Majesty King George V who throughout his long reign, perhaps the most difficult period in the annals of history, successfully played, with unsurpassed courage, a magnificent captain's innings."

The gathering was then entertained to tea given by the Chief Conservator, Board of visitors, Principal & staff of the College.

After the tea, His Excellency accompained by the Chief Conservator & many distinguished visitors paid visit to the museum, which they found to be very interesting & instructive.

The importance of ecology in Forestry.

By,

P. S. Sivaramakrishnan, B. A.,

M. F. C. 1934 - 36 Division.

[Winning essay for the "Indian Forester Prize" for present students of the Madras Forest College, for 1936.]

What is Ecology?

Ecology is a study of plant communities as they occur in Nature. It takes into consideration the origin, development, function, responses and reactions of plant and animal communities in relation te environment factors in a given locality. Over and above this it seeks: (1) to *observe and record* how the several associations of plants arise and develop in different places and (2) to *find reasons* for these associations and the various ways in which they develop.

Ecological factors which govern vegetation.

The ecological factors governing the growth and development of plant communities can be grouped under three broad heads: (1) Physiographic factors such as light, humidity moisture, slope, aspect etc. (2) Edaphic factors such as soil moisture, soil population etc. (3) Biotic factors, ie., factors caused by plant and animal agencies, action of man, insects, birds, etc. These factors act on the plant as so many stimuli and the plant responds to each one of them. There is an optimum condition in one or all of these factors which is most suited for the development of a particular community. Sometimes the deficiency in one factor may be compensated by the superfluity of some other factor. A favourable atmospheric humidity may sometimes compensate for a deficient rain fall. Ecology in its widest aspects must include not only a comprehension of the physical site factors (climate, soil, presence of animal life etc) but also the influence of all living agents which react upon the site, the neighbouring vegetation as well as animals and insects.

The very plants growing on the site often have a marked influence in modifying the original factors which existed when the plants first arrived. This is a very important consideration. *Dalbergia sissoo* and *Acacia catechu* grow up on recently formed shingle deposits in loose porous soils Under the light canopy which these species produce, some shrubby undergrowth slowly crops up. The accumulation of humus soil which could retain a sufficient quantity of moisture produces conditions suitable for a light deciduous forest. Now due to the influence of earthworms and termites the soil conditions are changed and with this change we may get *Shorea robusta* under the light deciduous forest cover and ultimately Sal may establish itself on the site. This sort of natural succession eventually results in a stable vegetation which undergoes no further change so long as the general conditions of the site are not altered. In forestry we have to recognise the various stages in the development of crop from seedling to maturity. In ecology we have to study not only the growth (development) of an individual tree (as in Botany) or of a crop (as in forestry) but we study the history (or attempt to piece together or reconstuct the history) of the locality itself and try to obtain a connected story concerning all the various plant communities which have developed or may arise in the future on that site.

Influence of animals, birds, & insects:—

We often feel that some of the animals are destructive to forest growth. At the same time no forest officer can fail to realise the necessity of understanding the inter-relations between animal and plant life. Certain trees are dependent on certain insects for pollination and fertilization e. g. the fig insect or wasp (*Blastophaga*). Insects control production of fruits while it is not uncommon to see some trees killed by insects periodically. In the distribution of seeds we find elephants ejecting the seeds of *Terminalia belerica*,, Jackal prefering *Ziziphus jujuba* and breaking the pods of *Cassia fistula*, bear ejecting the seeds of *Gmelina arborea* and *Mimusops hexandra*. The destruction of Prickly pear by

Cochineal insect has an ecological bearing. Thus if we go on studying the ecological inter-relations of plant and animal life we may be in a position to make proper regulations to protect, reduce, or destroy wild life in our forests.

How does ecology help us in practical forestry:—

From the foregoing paragraphs it will be seen that forestry if it is to be practical on a scientific basis, must start off by recognising that forest vegetation is not just an aggregation of trees and other plants brought together by chance but a community which has arisen and developed according to definite biological laws. The art of forestry consists largely in the forester's skill in estimating the sum of the various inter-acting forces upon any one spot and then utilizing them to the best advantage. Thus we see that *forestry is mainly applied ecology* and the progressive development of the art and science forestry depends on the recognition of ecological foundations.

The aim of Forest ecology:—

Forestry consists in finding *a practical working agreement* between the wild unmanaged forest and the forest most useful to man. The managed forest is an artifical creation. Therefore it is liable te suffer, like man himself, from various ills — epidemics and various other pathological conditions due to mal adjustment. "The natural forest from the time vegetation first starts on a denuded site until the climax forest is attained is in a condition of adjustment" (Toumy) The more the forester understands the natural law of the jungle, the better he will be fitted to make the necessary adjustments. When man attempts to work a natural forest with the idea of increasing its economic value he will have to interfere more or less with the natural adjustment that is in progress towards its climatic climax (ie the ultimate expression of a particular envrironment). His actions may do good or harm to the forest. Some of his operations which are favourable economicaly (large scale fellings during times of war or boom) may he unfavourable from a silvicultural point of view. Though one may argue

that after all we manage our forests to get the maximum economic value out of it, none can deny that we could ignore the basic laws of forest reproduction and growth in the natural forest. We should study the history of the natural forest in order that we may be in a position to see what operation can be undertaken and carried forward in our attempt to increase forest revenue without seriously interfering with (or destroying altogether) the equilibrium which exists between forest growth itself and the climate, soil and other site factors enumerated in a previous paragraph. But Nature is infinitely variable. The site factors vary from place to place. Foresters in the past have been rather apt to go by rule of thumb and to force upon Nature a too rigorous and uniform a policy. It is only in comparatively recent years that foresters have shown a tendency to permit a wider and more varied scope to the vegetation under their control. The vegetation present on a site is the expression of the site factors operating on it. We see it for a short time and go away. We rarely perceive the gradual imperceptable changes that take place on it. Ecologists recognise that most types of vegetation are transitory, that different phases (or growth forms) arise, develop and mature and give place to others (vide the example of sal forest elsewhere). Ultimately a climax type of vegetation is reached, which is the final expression of the various climatic and other factors operating on the site and it differs from the preceding types in that it is stable or permanent.

When a doubt occurs whether any land is fit to keep as forest land or not the answer is best given after an ecological survey which should aim at finding the climax vegetation of the site. Such a survey will be able to tell us something about the past, present and the future of the site and once the survey is finished, the formulation of grazing and possibilities of the site can be roughly known. This survey can best be done during the preparation of a working Plan for the tract concerned, but it need not necessarily await a regular working Plan. One of the problems which will face the working Plan

Officers is to decide whether or not the economic forest — that which yields the greatest financial returns — is the climax type or no. If it is, he must take every measure to ensure that adequate protection is afforded to the forest against outside influences. He must also regulate the fellings very carefully to ensure that the requisite conditions for regeneration of the crop are obtained. *He must ensure that the climax conditions are not seriously disturbed during the fellings or so as to tkrow the successicn back to an earlier stage inimical to the regeneration of the desired species.* When evergreen rain forests (such as those found in Ghat Forests of Palghat Division and in Canara) are too rapidly cleared and burnt we fail to get the species that are felled and we find to our amazement a deciducus forest on the site. ·Dibbling with *Hopea parviflora* and *Artocarpus hirsuta* fail to come up on a rain forest site. The reason for this that: 1. The succession is thrown back. 2. The organic matter like humus, bacteria etc is destroyed. 3. The evergreen undergrowth fail to come up immediately when the soil gets exposed and deteroiated.

It often happens however that the economic forest is not the climax type. In this case it will be necessary for the forester to take steps to arrest the normal development of the vegetation at a stage most suited to the object of management and keep it there. For instance in some forests of the west coast (and other most localities such as Burma or Assam) there is a marked tendency for many deciduous hardwood forests to develop under protection first into moist deciduous forests with an evergreen under story, then into the semi evergreen and perhaps finally evergreen formation due to the production of conditions unfavourable to the perpetuation (regeneration etc) of deciduous species and favourable to the invasion of numerous soft wooded and valueless evergreen species which flourish under shade conditions. This might be arrested by the encourgement of ground fires to destroy the evergreen species and to bring in grass or perhaps clear felling the mature crop will be adequate, *provided weed growth can be controlled.* In

some places conditions suitable for the spontaneous invasion of hardwood evergreen species of economic value like *Mesua ferrea, Hopea parviflora, Artocarpus hirsuta* might be found. In such cases it is probably easier to work along with nature than against her. Wherever possible this rule should be followed. It does not matter whether regeneration is to be mainly natural or artificial. *No working Plan can be worked successfully unless ths prescriptions ensure that adequate conditions shall exist for the germination and growth of the species which it is proposed to regenerate or perpetuate.* Many past working Plans — notably in sal regions — have failed due to the lack of appreciation of essential ecological foundations for the prescriptions laid down with the result that regeneration was not obtained *at the time and place* where it was required. The regeneration of sal is primarily an ecological problem.

Then one of the things a student of forestry learns very soon in his experience is that general rules of thumb laid down for working a forest in one District do not apply when he is transferred to another District. In silviculture, only principles with general scientific foundations are applicable every where. Local rules (the result of observation and experiment in that locality) are not universally applicable. A student versed in ecological foundations is more versatile (or adaptable) to changed situations for he has learnt the habit of close observation of natural conditions and can apply himself to new problems promptly. For instance, if a student who had learnt only the technique of Teak regeneration on the West coast were to be posted to a Teak district in Central Provinces, where very different conditions prevail, he would find himself seriously at fault there. In the first instance teak is regenerated there almost entirely in the open : in the dry hot districts of Central India, regeneration of Teak is secured under some form of shelter-wood!

In complex pathological problems such as the spike disease in sandal an ecological survey will help to control spike disease to some extent. It is observed that the spread of spike disease

depends on the ecological make up of the area, Some of the host plants of sandal like *Azadirachta indica*, *Semecarpus anacardium*, *Cassia siamea* either neutralize the action of the virus (Spike disease is classed as a virus disease) or provide no attraction for the virus in their association. The application of ecological principles to the silvicultural control of lantana is worthy of interest. Bamboo, one of the few tolerent species under Lantana is put under Lantana thickets and tended until it dominates the Lantana and finally kills it.

The yield possibilities of a given site is determined by its most unfavouable factor. The improvement or mitigation of this factor is the first step that the forester should take to make his forest more productive. The yield from a *Eucalyptus globulus* plantation grown on a grassland type of soil is found to be only ⅔ of the yield for the same age and area, and species grown on a shola type of soil. The growth on grassland type is stunted and whippy and there is a marked absence of undergrowth except perhaps *Eupatorium glandulosm*. Soil profiles have been collected in our Ooty camp for analysis at Coimbatore.

Thus we see that Nature has developed such associations which the habitat factors of the locality would permit. The more profound our knowledge about the life history of our forests in all its aspects, the less will be our every day difficulties. In the preparation of a working Plan we find ecological surveys useful. Part I of a Working Plan gives a summary and appreciation of the various factors affecting the forest for which the " Plan " is made. In the words of Mr. Troup " the development of ecology as a science has given a special impetus to the study of physical and physiological conditions bearing on natural regeneration. In ecological language regeneration fellings are nothing more than a process of stimulating succession of a required kind. In order to achieve success it is necessary to study the conditions under which this can be affected by a partial or complete removal of the forest cover, resulting in the reduction of root competition, the admission of light, warmth, and precipitations and the alteration of soil conditions ". There

is much scope for research in the study of ecological problems and the progress of Indian Forestry depends on the amount of ecological research that we do.

Aknowledgment:— My thanks are due to Capt. P. W. Davis I. F. S., Principal, Madras Forest College, Coimbatore for the masterly way in which he expounded silviculture on ecological foundations both in the class room and in the forest. But for his unabated interest in the subject and emphasis of the ecological concept towards biological facts I doubt much whether I will be able to write an essay on the subject at all.

Specimens for the Zoo.

Madras is a splendidly generous province; and has frequently given away picked well-behaved elephants to various zoological societies.

An elephant trustworthy with a load of children is a big financial asset to a zoo. In Dublin, in 1934 autumn they were in sore straits. As readers may know, the Zoo is in Phoenix Park, where there is also occasional motor racing. One day the confidential she-elephant who was out exercising, got involved with some racing cars. She was terribly frightened, and a disaster occurred. After that she was not so completely to be relied on that children could be carried.

Madras has just given them "Saraswathy", from Nilambur. Saraswathi was learning the mouth-organ on her way home; for that Zoo goes in for music. We hope she will be a blessing to Dublin's Fair City and especially to its pretty girls!

Apropos, hunting in early 1935 in West Somerest, we met a charming young lady, Miss. Ida Ashton, of the London Zoo. We made her promises of creatures for her department, the Reptile House. A conscience guilty about those assurances bids us to write to the Madras Forest College Magazine. Even if chances of sending creatures do not occur, the bits about how to pack snakes are entertaining : Miss. Ashton wrote :—

"We are always extremely grateful for anything sent us, as it is impossible to get from dealers anything but the very ordinary stuff; and that at the most exorbitant prices—we have paid as much as £ 5 each for cobras.

Absolutely anything you come across in your wandering is likely to be of interest to us and most probably may be entirely new to our collection. I suggested snakes because they can be dealt with more easily—just slip each into a separate cotton bag and dip it in a bucket of water for a few minutes to give it a

drink, and it will last months. The most successful " parcel " we've received was one last year that arrived in this way. A large box with hinged lid had quantities of cotton bags tied on to screw-eyes in the lid, so that when the box was shut they each hung down separately. Every one arrived in splendid condition and one Russel's Viper managed to give birth to over thirty healthy youngsters on the way. The latter possibility, incidentally, is why we like bags in preference to boxes which may have cracks through which things eke out—you can tip out a bag and there you are, whereas you may open a box expecting one beast and a dozen dart out at you.

Lizards, though perhaps more charming, are not so easy to transport unaccompanied. They need food in the way of cockroaches and water regularly and even then often don't survive the journey.

Frogs and toads again are a joy to us, but ' nervy ' travellers. The former particularly will jump about and knock their noses causing a raw wound which very rapidly goes septic and spreads, as well as encouraging a fungoid disease *which* is contagious ".

* * *

" Freight is best paid this end, and Society is always ready and willing to pay this and other expenses ".

* * *

Notes on the Collecting and Transport of live Reptiles and Batrachians for the London Zoo, Regent's Park, London, N. W. S.

The specimens particularly wanted by the Zoological Society are those not often obtained from dealers. Large and striking species are probably better known, but make attractive exhibits for the general public; while small dull-coloured ones are more likely to be of scientific interest. Because a species is very common locally it does not follow that it is of no interest; it may have only a local range, or may not have attracted the

attention of dealers. As most specimens reaching the Gardens are brought by sailors, those coming from inland places or far from large ports are likely to be more acceptable.

Collecting Snakes : A cotton bag, say 2 feet by 8 inches, closed by *two* safety pins, and a forked stick, which can be cut on the spot, are the only appliances needed. The snake is pinned to the ground by the fork across the neck, and picked up by the neck to transfer it to the bag. There is no danger if care is exercised, and the only risk arises when familiarity has bred contempt. The second safety pin is to confine the first snake to the bottom of the bag while a second is being introduced. In an emergency a bag can be improvised by pulling a handkerchief through a finger ring. If a bottle is used instead of a bag care must be taken not to leave it in the sun, or the heat rapidly kills the snake.

Collecting Lizards : Most lizards can be noosed with a cotton running loop on the end of a long stick. The more nervous ones may need a cane 10 feet long to approach them, and large species such as iguanas and monitors need stout string for the noose. Digging lizards out of holes is often an impossibly long task, for their burrows may run many yards through stoney ground ; often they can be headed off from their holes and made to take refuge in smaller crannies or under logs from which they can be picked out. "Gassing" lizards from their holes with calcium carbide occasionally works. If native boys are promised a few cents they will usually bring more of the commoner lizards than one could catch onself in twice the time, especially if they are shown how to noose them.

Collecting Batrachians : No special advice can be offered as to catching frogs, newts, etc., beyond searching their obvious haunts and breeding spots. Many are caught better by night with an electric torch. For all reptiles and amphibians it is often worth while to chop into hollow trees in forest country, and to explore rotting logs.

Care before shipment : There is never any hurry to feed the newly-caught specimens ; few will suffer for a month's starvation if necessary, but water should always be provided, even though they are never seen to drink. Some lizards will only take water in the form of drops sprinkled on leaves, and some desert species only absorb moisture through the skin and should be sprinkled daily. Frogs do not drink, but must be kept moist by bedding on wet moss, etc. As a general rule snakes that hunt by day feed on lizards or frogs, and night hunters eat mice, and food may be offered accordingly, but live mice or rats should never be left in a cage, for they often kill or damage the snakes. Lizards as a rule eat insects of many kinds, and can be trusted to avoid poisonous ones. A fly trap or stock of mealworms should be kept going for them if they are to be kept long before shipment. Many of the larger lizards will take scraps of raw beef while iguanas and other vegetable feeders take lettuce leaves.

Shipment : Small reptiles often travel successfully by post. Packages should be marked " Scientific Specimens of no value " *not* " Live Animals ". Many countries have regulations prohibiting live animals in the post, and in any case poisonous snakes should never be so sent. Frogs if packed in damp moss travel well by post.

Large, delicate, valuable or poisonous animals can only be sent in charge of a passenger or member of the crew. If this is done and an airmail letter sent at the time of their dispatch announcing when and where they will arrive, they can be met either at the English port or London terminus.

A friendly drink with the Captain will usually result in reptiles accompanying a passenger travelling free of charge, and if objection is raised to carrying live snakes it can often be met by tbe suggestion that they should be stowed in one of the ship's life-boats.

Packing for Shipment : (1) Poisonous snakes are better sent each in a separate cage so that in the event of death of one of them the cage has not to be opened to remove it. A suitable

cage is one made of stout well seasoned wood that will not warp with moisture, and without knots that might fall out. If fitted with mosquito wire gauze this should be double, with at least an inch space between the layers, and on top of the cage, so that water may be poured through it to a drinker below.

(2) Non-poisonous snakes may be packed several together. but need an equally safe cage in view of the general horror of snakes. Snakes roughly equal in size can be packed in a very small space. It is a mistake to feed them on the voyage, though they need water, and cages should be permanently nailed or screwed up. To avoid accidents in unpacking please label " Snakes ".

(3) Lizards need more space than snakes; a box a foot sqnare and six inches high would accommodate four lizards each eight inches long. Small lizards and vegetable feeders are better for being offered food three or four times in a voyage of a month's duration, or a supply of insects may be packed with them. A small hole stopped with a cork serves to introduce food and water and hook out dead ones without risk of others escaping.

(4) Frogs need a well padded box, or they rub their snouts raw leading to a bone infection which kills them. They are best kept moist on a bedding of sloppy-wet clean cotton waste or other non-fermentable material. Ventilation can be provided by wrapping wool or cotton waste round separate lid boards with a bandage, and nailing on with ¼ inch intervals. They require no food during the voyage, but the bedding must be kept constantly moist.

Note :— It is not really advisable to send reptiles or batrachians to arrive in England from about the beginning of October to the end of March, on acount of frost during the latter part of the journey.

* * *

If these remarks and extracts renew someone's interest in natural history, he will really be the gainer himself. An Indian Officer of I. F. S., remarked that English boys learn natural history hobbies from their parents; and that as forest men it gives them a pull over their Indian confreres who suffer for lack of distractions in the forests.

In Madras Presidency, one of the boldest snake-catchers of our time was Mr. H. A. Latham. A perhaps untrue but anyhow appreciated tradition of him runs thus :— Deep peace and a hot weather afternoon. Mr. Latham, the Conservator, returning through the forest from inspection : in his right hand a butterfly net, and in his left, clasped at the correct spot, an incensed snake he had caught. A stout Range Officer (name unfortunately not discovered) completes the scene: meditative yet keeping his distance from the reptile, following home his officer.

Sudden transformation : Mr. Latham is away fifty yards after a butterfly whilst the Ranger stands frozen with horror: in his hand the neck of the lively serpant, that had been flung into his keeping before his mind began to work !

A. F. M.

EXTRACTS.

1. American Flood Devastation :

Every now and again, Nature seems to take an impish delight in playing havoc with man's efforts to control her vagaries, flinging aside his puny restraints and sweeping both him and his works into a common destruction. One of her most potent agencies is water, and the catastrophic visitation which, following sudden heavy rains and melting snows, descended on fourteen highly industrialised and commercial States in the eastern part of the North American Continent during the past week or ten days is the latest example of her indiscriminate violence. On March 18, with little or no warning, the Pennsylvanian towns of Johnstown and Pittsburgh, notable centres of the steelwork industry, found their streets submerged to depths of 13–15 ft., and in places considerably more, so that the unfortunate inhabitants were speedily reduced to dire straits from shortage of food and drinking water. Many were compelled to spend a night of terror perched on the root of their houses, scantily clothed, while a number of them, approaching one hunderd, regrettably lost their lives in the darkness and confusion. Johnstown was the scene of a terrible disaster in may 1889, when a reservoir above the city collapsed, causing the loss of 3,000 lives. Pittsburgh, too, had a serious flood in 1913. On the present sccasion, the estimates of damage to property run to 40 million pounds sterling at Pittsburgh and 7 millions at Johnstown, at which latter place some 8,000 persons are said to be homeless. The whole countryside, in fact, in eastern Pennsylvania has been more or less under water.

Practically simultaneously. the rivers in all the New England States, with those in New York, New Jersey, Delaware Maryland, Virginia, West Virginia and Ohio, rose to flood heights. The River Connecticut broke down dams and bridges, inundating towns and low-lying districts, and causing factories to close, throughout its entire length from northern New Hampshire to long Island Sound. In the State of Massachusetts industry and transport were similarly paralysed. The damage to property in New England is put at more than ten million sterling. Farther south, the River Potomac has been badly swollen and the city of Washington was invaded. Although at the time of going to press the floods are reported to be subsiding in the afflicted districts, apprehensions are entertained as to

the creation of new danger areas when the augmented waters of the Ohio reach the Mississippi at Cairo (Illinois). Portsmouth (Ohio) aod Cincinnati are threatened, and hurried precautionary measures are being taken. So widespread has been the calamitous visitation that it has extended even into Canada, affecting the provinces of Ontario, Quebec and New Brunswick. Fredericton, the capital of New Brunnwick, has been largely under water, in addition to large stretches of the adjoining country.

— *Nature*, *28–3–36*.

2. Hyaenas:

Hyaenas resemble dogs rather than cats in external build, and may be easily taken for members of the Dog-tribe. Structural details of the skull and the character of the teeth however definitely place the Hyaenas within the Aeluroid or Cat Section of the Carnivores.

The closest relatives of the Hyaenas are believed to be the Civets and Mungooses. Some authors trace a particular affinity between hyaenas and mungooses—both groups of animals having certain points of structure in common. The relationship between hyaenas and civets and their kindred is not very apparent in existing species, but it is more strikingly revealed in the structure of extinct forms which lived during past geological epochs. In the lower part of the Pliocene there occurs an interesting civet-like animal known as the Ictithere which in its structure serves to reveal a close alliance between these two families of Carnivores.

During past epochs, hyaenas inhabited the greater part of Europe and ranged in Asia as far east as China. Fossil species are numerous. No less than 5 different species have been found in the Siwalik fossil beds of the Punjab. One of these extinct forms from Northern India, in the length of its jaws and in the form and number of its teeth makes a close approach to the civets. The teeth of the present day hyaenas are in some respects feline in character and differ in these points from the teeth of civets. A hyaena has 34 teeth in its jaws, a cat 30 and a civet usually 44. The numerical difference in the teeth of cats and hyaenas is accounted for by the retention in the Hyaena of an additional premolar tooth, on each side of both in the upper and lower jaws. A hyaena has 4 premolars and 1 molar on each side in its upper jaw, and 3 premolars and 1 molar in the lower. As in Cats, the last tooth in a hyaena's upper jaw is reduced to a minute tooth. All the cheek teeth in the lower

jaw are conical teeth with sharp cutting blades. But the distinctiveness of the Hyaena's dentition is seen in the great size and strength of the cheek teeth as compared with the canines; more specially in the massive conical crowns of the second and third premolars in both jaws. These teeth carry a strongly pronounced basal ridge which acts as a shield for protecting the gums. This form of tooth is especially designed for gnawing and breaking bones. The teeth and jaws of hyaenas have assumed those characters which adapt them for their peculiar food and habits. The Hyaena is a scavenger. It feeds on the bones and the coarser remains left over by beasts of prey. The whole skull has its shape modified by the enormous devolopment of the muscles which work the jaws and teeth. Few Carnivores have jaws and teeth which can compare in strength or bone crushing power with those of hyaenas.

The Hyaena is a massively built animal with broad short head and a deep body. Its legs are comparatively long—particularly the fore limbs, so that the hind quarters droop. The massive build of the fore part of the body as compared with the hind, and its knock-kneed hind legs gives the hyaena an awkward, hang-dog appearance. The hair is coarse and shaggy. The thickness of the coat, the colour and the boldness of the markings appear to vary with season.

A hyaena has only 4 toes on its fore and hind feet, the digits corresponding to the thumb and the big toe are absent. The claws are short and blunt, they are unprotected with sheaths and are non-retractile. The pads under the toes show several peculiarities. The bases of the toe pads are set at right angles to the central or the plantar pad of the sole. Again the pads are not elliptical but more or less conical in shape. In the uptilting of the toe pads, in their rigidity, compactness, and shape as well as in the short blunt claws the feet of hyaenas resemble those of dogs. The toe pads of cats and civets are usually elliptical in form, and their bases lie in the same plane as the plantar pads of the sole. Hyaenas have anal glands which exude their secretion into a pouch. The presence of an anal pouch in hyaenas and mungooses is cited as part of the evidence of affinity between these two animals. But Pocock has indicated the considerable difference between the anal pouches in the two groups. In mungooses the anus opens in the centre of the anal pouch and the margins of the pouch and close right over the anus, also the orifices of the glands are situated tolerably near the anus. In the hyaenas on the other hand, the opening of the pouch appears as a curved slit over the anus, the orifice of the glands are far removed from it.

The existing species of hyaenas are three in number. All of them are included in the genus *Hyaena*. Only one species the Striped Hyaena is found within our limits and extends its range into Africa. The Brown Hyaena (*H. bruneus*) and the Spotted Hyaena (*H. crocuta*) are now limited to Africa. Fossil remains of the Spotted Hyaena have been excavated from some caves near Kurnool in the Madras Presidency, indicating the past existence of this species in India.

3. The striped hyaena (Hyaena hyaena Linn):

The Striped Hyaena is found throughout the Peninsula of India. It is not found in Ceylon nor in the countries to the east of the Bay of Bengal. In the west its range extends through South Western Asia into East and North-West Africa. During and before the age of the Mammoth, the Striped Hyaena inhabited a considerable part of Europe. Its bones have been discovered in a cave in the south of France, and teeth of this species have been found in England.

The colour and markings of the hyaena vary considerably with season. Much depends on whether the animal is in fresh coat or has shed its hairs or whether it is in its fuller winter coat. Various races of this animal have been described without any account being taken of these factors. Linnaeus originally gave the name *hyaena* to a hyaena from South Persia. The Persian animal is believed to be similar to the Indian, but if the Indian form is proved to be distinct, it will carry the name *H. h. indica* Blainville.

The Indian Hyaena does not develop a very long winter coat; but it is full, much fuller than the hot weather coat and comparatively soft. The colouring is cream or buffy white and the head tawny buff—the whole colour tone changes to grey or dirty white in the harsher and scantier summer coat. The transverse stripes fade from black to brown—they may be less evident in the fuller winter coat or again tend to become obliterated in cases where the subsequent shedding of the hairs leave the flanks of the animal almost bare.

The Striped Hyaena stands about 3 ft high at the shoulders—the head and body of a male measures a little over 3½ ft. and the tail with terminal hairs is about 1½ ft. in length. A goodsized female may scale 75 lbs.—the male is about 10 lbs. heavier. Hyaenas are more common in the drier parts of India—particularly among rocky hills or nullahs—or by the outskirts of jungles in the plains. They are found in the open areas of the Nilgiris around and above Ootacamund at elevations

ranging from 3,000 to 8,000 ft. They usually shelter in caves, or among boulders, and frequently make a den in an enlarged porcupine's earth. Hyaenas are nocturnal in habit coming out in quest of food about sunset and retiring before sunrise. They usually go about in pairs—parties of five or six have been seen together, but this is unusual in with this species. They are great wanderers and their tracks are quite common. The foot print is much like that of a dog—except that the print of the fore foot is much larger than the hind. The pug is easily differentiated from that of a panther by the print of the claws.

The hyaena is mainly a scavenger, and as such performs a useful task. It feeds on the carcases of animals that have died of disease or been killed by other beasts of prey. The carcase is eaten where it lies but portions of it may be carried off into the animal's den. Hyaenas sometimes kill and carry off sheep and goats. They are particularly partial to dogs. They do not usually attack larger cattle. There is a record of two cows, tied up as a bait for tiger being killed by a hyaena. The stomachs of the animals were ripped open and they were literally eaten into when yet alive. It is recorded that this species is far more aggressive in Africa than it is in India and that, in Abyssinia, striped Hyaenas have developed a habit of killing sheep and goats and frequently run amock in a flock killing a dozen or more animals. Fortunately in India our hyaena can in no sense be considered aggressive despite its bulk and power, it does not attack larger animals, though individuals may be quite prepared, if need be, to appropriate and dispute the kills of panthers or even tigers. There are several instances on record of hyaenas depriving panthers of their kills and of routing them in disputes.

While hunger may give the hyaena inordinate courage, when brought to bay, it does not show fight. Dunbar Brander states it will frequently sham death when harried by a pack of dogs, submitting passively to the direst worrying and ill-treatment.

Though not usually very demonstrative hyaenas give vent to various weird noises, a common sound is a loud laughing chatter.

Little is known about the breeding habits of hyaenas, it is recorded that in the Central Provinces they breed during the cold werther and that the young are generally born in the hot weather—5-6 being produced in a litter.

When taken young, hyaenas are easily tamed and make very affectionate and docile pets.

Journal of the Bombay Natural History Society, Dec. 1935.

4. Reserve Materials in the Felled tree :

An interesting paper by S. E. Wilson on "The Fate of Reserve Materials in the Felled Tree" (*Forestry*, 9, No. 2; 1935) is of interest since it would appear to afford some light on seasoning investigations. As is well known, forest trees are usually felled in the winter when the sap wood contains abundant reserve food materials. These, as starch, sugar, fat materials, etc., occur within the living storage cells. The fate of the reserve materials is now shown to depend on the treatment of the timber after felling. If the log is kept whole, and the bark retained to prevent rapid drying, the storage cells continue alive until all reserves are exhausted; whereas if the timber is converted quickly, and the cells killed by desiccation or kiln-heat, the reserve materials remain intact and cannot thereafter be removed by any known treatment. Timber containing reserve materials is shown to be a ready prey to wood-tunnelling beetles, for example, *Lyctus*, and sap-staining fungi. The author puts forward suggestions for the co-operation of forest botanists with timber technologists in order to extend the knowledge of these important reserve materials with the view of the better utilisation of British (and it may be added tropical) timber trees.

— *Nature, 18–4–36.*

5. Food from Wood :

The suggestion has recently been made that as much food might be obtained per acre of woodland as per acre of arable land, if the wood be so treated as to yield sugar. The production of sugar from wood has been a subject of much research, especially in Germany and the United States. There is no doubt that it can be achieved, not only on a small laboratory scale but also in commercial plant operation; the difficulties that have had to be overcome have been those of chemical engineering rather than of chemical reactions. There is, however, a very real doubt whether such a process is justifiable, save perhaps in time of national emergency (for which purpose it was developed in Germany during the Great War), or whether it can ever be economically a sound proposition.

From a material point of view, timber is grown for two main purposes—either for use as a structural material or for its cellulose content. There are perhaps few structural uses of timber that could not be satisfied by other materials. Cellulose, however, is as yet quite indispensable, not merely as pulp and paper, but also in its myriad new uses for textiles or rayon, lacquers, cellophane, etc. To split up such a valuable raw material to sugar is certainly unsound from the point of view of

the proper utilisation of natural resources, and only justifiable if the products cannot be obtained from any other source. The agriculturist will answer that sugar of a purer and more usable type may be obtained directly from sugar beet, or from cane, or can be obtained far more simply from starchy crops such as potatoes or maize. Sugar beet is capable of yielding 2–3 tons of sugar per acre, and sugar cane 4–5½ tons per acre. The starch in potatoes amounts to 1½–2 tons per acre, or in maize, 1 ton per acre, equivalent to an almost equal weight of sugar,

To make a comparison of these yields with those possible from woodland is difficult, inasmuch as the latter is obviously not an annual crop. The faster growing soft woods (conifers) may be said to give more than 300 tons of timber per acre per 100 years, or 3 tons per acre per year. The maximum yield of wood sugar so far claimed is two thirds of the weight of the wood, or 2 tons per acre on an annual basis. This calculation is rather questionable because the annual rate of increase of saplings is much greater for the first ten to twenty years than at maturity, and the yield of wood sugar per acre obtainable from young growth might be at a higher level. Against this must be set the fact that the rate of growth of most woods is considerably below that of the very vigorous soft woods such as silver fir.

In normal circumstances, the commercial production of wood sugar, though a remarkable feat in chemical engineering, cannot be taken as any threat to agriculture in view of the heterogeneous nature of the product obtained, and the growing world shortage of timber for pulp. Claims have been made that in the most favourable situation and conditions glucose might be obtained from this source more cheaply than sucrose from sugar beet. Ordinarily, however, there must be a wide disparity in costs, and sugar beet cultivation has the advantage additionally of giving much employment. One development which might make the wood sugar process economically possible in normal times would be a demand for lignin for some manufacturing purpose. At present the residual portion of the wood, consisting almost exclusively of lignin, remains unutilised. This amounts to 20–30 per cent of the weight taken. The possibilities of lignin as a raw material in industry have not been adequately considered, perhaps because the constitution is still obscure. Because of its marked resistance to biological attack, and inertness to strong chemicals, other than oxidising agents, it should find a useful outlet. The production of wood sugar and lignin from wood would then be more defensible than that of sugar alone.

— *Nature*, 25–4–36.

6. A Malaria Survey in Western Bengal :

Dr. Harry G. Timbres has published the results of a malaria survey carried out by him in western Bengal (*Rec. Malaria Survey of India*, 5, No. 4, 345 ; 1935). The studies covered seven villages, with a population of 2,582 persons, lying in an area of 9½ square miles in the district of Birbhum. Rice is extensively cultivated, and although there are no swamps, irrigation channels are numerous, coming from small storage lakes. The survey occupied eighty-nine weeks from July 13, 1932, until March 31, 1934. Malaria is very prevalent in the district, sixty per cent at least of all cases of illness being due to this disease. It is conclusively shown that the chief mosquito conveying malaria in that region is *Anopheles philippinensis*, formerly only suspected of being a carrier. This species is definitely anthropophilic, that is prefers man as a victim rather than animals. There are other related species in the district, anthropophilic and capable of carrying malaria, but to a much less marked degree. *A, philippinensis* is found to leave the houses during the day, and to return in numbers in the late hours of the night. It is much more readily infected with gametocytes early in the malaria season, when it is a comparatively rare mosquito, than later on when it is numerous. Other anophelines in the region, which are not concerned in carrying malaria, exhibit a preference for bovine to human habitations, and are zoophilic rather than anthropophilic. The author suggests that there may be a relation between anthropophilism and those factors which make an anopheline a carrier of malaria.

— *Nature, 2–5–36.*

7. Fireproofing of Wood :

Development in Promising Field for Timber Utilisation.

Snippets from historical records go to show that the fireproofing of wood has been a matter that has engaged attention for centuries. To-day, when efforts everywhere are being directed to the wider utilisation of wood, the subject still occupies a good deal of thought, and the application of time and labour by scientists and research workers. In Great Britian, certain achievements have been recorded. A good deal of active research on fresh lines is in hand, and it is anticipated that at an early date definite news of a development of considerable importance will be issued,

A Process Tested.

The Underwriters' Laboratories, of Chicago, which are owned by the National Board of Fire underwriters, who fix all fire insurance rates in the U. S., have, we learn, issued a report on the Protexol fireproofing process, which they have accepted for listing and label service, and certify it as entitled to the same low rates of fire insurance as steel, concrete brick, marble, or other incombustible materials.

As the majority of fires in buildings, ships and dwellings have their beginnings in the interior of these structures, the use of fireproofed wood for floors and interior trim would be an effective method of combating loss, states the Underwriters' Laboratories.

" Practically non-combustible and non-flamable, " is the evaluation of the effectiveness of the fireproofed wood tested by those Laboratories. Walls or floors of this material, tests show, will act as fire-stops and prevent the passage of fire through them, thus confining the conflagration to its point of origin and and preventing its spread. It is further stated in the report approving this material that its fire-resisting properties will last throughout its useful life.

The material investigated and approved was fireproofed lumber of red oak and maple for flooring and interior trim The successful fireproofing of this lumber is effected by a method not unlike that used in the treatment of telegraph poles, railroad ties, fence posts, etc , with cresote for protection against decay, except that incombustible salts are used in the case of the fireproofed lumber. The technique of the process is exacting, as its success depends largely upon getting the correct kind and amount of chemicals into the wood. Protexol Corporation, who have been wood preservers since 1887, were impregnators of the fireproofed lumber investigated.

Properties of this lumber other than its fire-resisting qualities were also investigated. Its workability was found to be equal in every way to that of untreated lumber. Its ability to take paint and varnish is not altered, its appearance is unchanged and its weight is only slightly greater than that of untreated material.

In the tests conducted at Underwriters' Laboratories actual fire conditions were created. Whole floors of the fire-proofed lumber, and others of untreated lumber, were subjected to a roaring inferno of gas-fired furnaces specially designed for such

work. Through windows the behaviour under fire of the fireproofed and the untreated floors was observed and compared by one group of engineers, while 100 ft. away other engineers recorded the temperatures of the floors by means of meters connected with thermocouples.

The fireproofed floors came from the furnace at the completion of the tests blackened and charred on the exposed surface, but intact and otherwise sound, having successfully stood as a barrier against the fire and prevented its passage. The untreated floors did not fare so well. They ignited and, on completion of the tests, were burning on both the exposed and unexposed surfaces.

Fire-spread tests in a horizontal furnace, where the flames were played on one end of the flooring, were also conducted. Chemical and calorimetric tests were performed on numerous samples conditioned in various ways. Test floors were repeatedly washed to determine the lasting quality of the fireproofing. For thirty days an automatic machine scrubbed them with cleaning compound, flushed with clear water and dried the surface every 30 minutes, and then repeated the operations. All of these tests, as well as others, conducted on a great number of samples, are reported to have shown the merits of the fireproofed lumber.

— *Timber Trades Journal, 9–5–36.*

8. Teak Squares :

First Standard Grading Rules Issued.

From time to time over a course of years the question of devising standard rules for the grading of teak squares has been raised. When first brought forward we believe there were some who regarded the idea as impracticable, but now, after years of study and labour applied to the problem, rules have been drawn up and a copy reaches us this week from Delhi, where they have been published. To the word of congratulation due to those responsible for the immense amount of work involved in the collection and analysis of statistical data and the preparation of the final rules may be added a word of praise for the very handy pocket form (linen coverd and with press stud) in which they are issued.

Mr. C. G. Trevor, President of the Forest Research Institute at Dehra Dun, tells in a concisely worded preface how the work of preparing for the rules was done. The task was undertaken by the institute at the request of the Chief Censervator of

Forests, Burma, and the Indian Railways. Mr. L. N. Seaman, then O. C. of the Timber Testing Section, was deputed to study, in co-operation with the Burma Forest Department and the chief teak firms, the existing system of grading. In 1934 three forest officers spent six months in the saw milis of those firms, observing and preparing in tabular form all the defects in each square passed by the respective firms as belonging to the different existing grades. In this way details of defects in 6,000 squares, aggregating about 187,000 cu. ft. of teak were obtained.

Teak Producers' Assistance.

Having got this mass of detailed information, Mr. Seaman and his staff proceeded to analyse it, preliminary rules were drafted showing allowable defects in the different grades, and eventually the various interests concerned met and discussed the position. The five teak lessees agreed to try out draft rules in actual working and make their own practical suggestions, and the rules have since been modified on the lines of the suggestions received. After Mr. Seaman left India the rules were re-written by Mr. V. D. Limaye (Officiating Officer in Charge, Timber Testing Section, Dehra Dun) in the light of the further suggestions made. Now the rules have been accepted by the teak lessees of Burma, and the Timber Adviser to the Railway Board, and the Army. The rules, states Mr. Trevor's note, are equally applicable to mill-sawn squares from Siam and other countries. An index is provided to facilitate reference, and at the end is inserted a " table of defects. "

A further note given in the booklet just issued, indicates that as these are the first standard grading rules for teak squares ever published, it is too much to expect that this first edition will be free from the necessity of future modification. The rules are therefore published subject to such additions or modifications as experience may from time to time prove to be necessary.

— *Timber Trades Journal, 16–5–36.*

Notifications Relating to Rangers.

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Waltair Circle.

16—4—36. Mr. T. S. Ratnavelu Mudaliar, Pulusumamidi Range, Godavari Upper Division, granted leave for four months from date of relief. 2. Mr. C. S. Sivagnanam, trained Forester, Ganjam District posted to Pulusumamidi Range, to relieve No. I.

22—5—36. Mr. V. N. Leapingwell, granted extension of leave for one month from 6—6—36 in continuation of the leave already granted.

12—6—36. The leave on average pay for one month granted to Mr. K. A. Muddayya extended by two months.

26—6—36. 1. Mr. V. N. Leapingwell, on expiry of leave posted to Palnad Range, Guntur Division.

7—7—36. Mr. J. D. Theodre, granted extension of Leave for 2 months from 21—6—1936.

8—7—36. Mr. A. S. Kaunds, Trained Forester and Officiating Ranger last grade to continue to officiate as Ranger last grade from 6—6—1936 to 30—7—36 *vice* Mr. A. Subrahmanyam, Ranger Sixth grade, granted leave for 4 months from 31—3—1936. 2. Mr. Ahmad Sheriff, Trained Forester to officiate as Ranger last grade from 13-5-1936 to 30-7-1936 *vice* Mr. N. Chakrapani Iyengar, Ranger Fifth grade granted leave from 29-11-1934 to 25-11-1936. 3. Mr. K. Subbanna, Trained Forester to officiate as Ranger last grade from 13—5—36 to 5—6—36 *vice* Mr. A, Subrahmanyam, Ranger Sixth grade granted leave for 4 months from 31—3—36 and from 6-6-36 to 5-7-36 *vice* Mr. V. N. Leapingwell, Ranger Sixth grade granted extension of leave from 6-6-36 to 5-7-36.

13—7—36. Mr. A. Subrahmanyam on expiry of his leave posted to Pulusumamidi Range, Godavari Upper Division. 2. This cancels the posting of Trained Forester C. S. Sivagnanam to the Pulusumamidi Range.

Bellary Circle.

12—4—36. Mr. K. Purushothama Rao, Ranger Fifth grade, Kurnool South, granted extension of leave for 3 months from 24—4—36.

8—5—36. Mr. B. T. Seetharama Iyer, Vonipenta Range, Cuddapah North division granted leave for two months from 1—6—36 or date of relief. 2. Mr. Ansar Badshah Sahib, trained Forester, Cuddapah North division posted to Vonipenta Range, *vice* No. 1 or until further orders.

31—5—36. Mr. N. Sundaresa Ayyar, Madanapalli Range, granted leave for four months from 1—7—1936 or date of relief.

14—6—36. Mr. S, Pitchiah Naidu, M. R. H. Forester Second grade transferred from Working Plans circle posted to Madanapalli Range, *vice*, Mr. N. Sundaresa Ayyar, granted Leave for 4 months. 2. The posting of Mr. S. Pitchiah Naidu to Cuddapah South division is hereby cancelled.

22—6—36. Mr. T. G. Sitarama Mudaliar, on expiry of his leave on 30-6-1936 posted to Cuddapah North division.

23—6—36. On the expiry of a month's leave from 10-6-1936 Mr. B. Krishna Rao, posted back to Markapur Range of Kurnool East division.

1—7—36. Mr. S. Pitchayya Nayudu, Trained Forester is posted to Vonipenta Range, Cuddapah North division. Ansar Badaha Sahib acting Ranger, Vonipenta Range on relief by Mr. S. Pitchayya Nayudu, posted for duty under the District Forest Officer, Cuddapah South division.

7—7—36. Mr. S. Ramachandra Iyer Cuddapah North Division granted extension of leave by 8 days from 9—7—36, On expiry of leave he should rejoin Vontimiita Range. 2. Mr. C. R. Rajagopalan will continue to be in additional charge of Vontimitta Range. in addition to Sidhout Range. Vice No. 1

12—7—36. Mr. T. G. Seetharama Mudaliar, on special duty in Cuddapah North Division to work under the orders of the District Forest Officer, Cuddapah South.

17—7—36. Ansar Badsha Sahib, Trained Forester, Cuddapah South division posted to Markapur Range, Kurnool East division relieving Mr. S. Sankaran, Ranger now in additional charge of the Range,

17—7—36. Mr. K. Tiruvenkatachari, Sivapuram Range, Kurnool West division granted leave for two months with effect from 1-8-1936 or date of relief. 2. Mr. B. T. Seetharama Ayyar, on return from leave on 1-8-1936 posted to Onipenta Range, Cuddapah North division. 3. Mr. S. Pichayya Nayudu, Trained Forester and acting Ranger on relief by No. (2) posted to Sivapuram Range, Kurnool West division vice No, (1) granted leave.

21—7—36. Mr. B. T. Sitarama Ayyar, Ranger granted extension of leave for one month from 1-8-1936 subject to eligibility 2. Mr. T. G. Sitarama Mudaliyar posted to Vonipenta Range, Cuddapah North division *vice* No. (1) 3. Mr. S. Pichaiya Naidu, Trained Forester, on relief by No. (2) will take charge of Sivapuram Range, Kurnool West division as already ordered.

23—7—36. Mr. S. M, Krishnaswamy Ayyar, granted extension of leave for four months from 27—7—1936.

Working Plans Circle.

26—6—36. Mr. P. Krishnan, Ranger, Seventh Grade No. 1 Working Plans Division (Nilambur) granted leave on average pay without medical certificate for one month from 2—6—36 to 1—7—36.

Salem Circle.

6—5—36. Mr. P. B. Syed Yahia Saheb, Harur Range, Salem Central Division, granted leave for 4 months from 1—6—36. 2. C. B. Pemmiah, Trained Forester Second grade, Vellore West division, on return from leave on 1—6—1936, promoted to act as Ranger last grade and posted to Harur Range, *vice* No. 1 on leave or until further orders.

8—5—36. Mr. V. Narayanaswami Ayyar. Odugathur Range, granted leave for two months from date of relief. 2. Mr. R. Manickam Pillai, Tiruvannamalai Range, transferred to Odugathur Range, *vice* No. 1 granted leave. 3. Mr. M. P. Philip, Polur Range, to be in additional charge of Tiruvannamalai Range until further orders.

26—5—36. Mr. S. A. Dawson, Atur Range, Salem South division, granted leave for 2 months from date of relief. 2. Mr. T.N. Vedantaramanujam, posted to Atur range *vice* No. 1 granted leave.

16—6—36. Mr. P. Shunmugasundaram Pillai, Ranger Seventh grade (Temporary), granted further extension of leave for three months from 7—6—1936.

30—6—36. Mr. B. V. Vaideeswara Ayyar, Chittoor division on return from leave (15—7—1936) posted to Tiruvannamalai range, Vellore East division to relieve Range officer, Polur, in additional charge of the Range.

7—7—36. Mr. M. S. Krishnaswami Ayyar, Chittoor Division, granted extension of leave for 4 months from 21—7—1936.

11—7—36. Mr. V. Narayanaswami Ayyar, Vellore East Division, on return from leave (on 15-7-1936) posted to Gudiyattam Range, Chittoor Division. 2. Mr. P. K. Subbanarayana Ayyar, Gudiyattam Range, Chittoor Division, on relief by No. 1 transferred to Mamandur Range of the same division, to relieve Range officer, Chandragiri, in additional charge of Mamandur.

23—7—36. Mr. Syed Munavar Saheb, Salem South Division, granted extension of leave on half average pay for 4 months, on medical certificate, from 18—7—1936. 2. Mr. M. M. Ponnappa, will continue to act as Ranger last grade, vice No. 1 or until further orders.

Coimbatore Circle.

25—1—36. Mr. V. Maragathavelu Forester I Grade, Madura division, posted to Tunacadavu Range, Coimbatore South division *vice* Ranger C. K. Unni on leave. He will act as Ranger Seventh Grade subject to the approval of the Chief Conservator of Forests.

8—5—36. T. Kondathu Gounder, posted to Palani Range, Madura Division, in relief of Ranger Mr. A. Culas holding charge of the Range in addition to his own (Ayyalur). He will be relieved at Topslip either by Ranger Mr. C. R. Raghunathan or by Ranger Mr. C. K. Unni whoever joins the Division first.

13—5—36. The posting of Forester V. Maragathavelu to Tunacadavu Range and to act as Ranger is cancelled.

9—7—36. Mr. T. Kondathu Gounder, granted leave from 2–6–1936 to 9–7–1936.

15—7—36. The posting of N. Ramakrishnan, Trained Forester, to Natham Range on return from Forest College, is cancelled as he has since been transferred to Ootacamund Circle.

17—7—36. Mr. M. Gopalasami Naidu, posted to the sandalwood depot at Satyamangalam.

17—7—36. Mr. S. Sundaravaradachariar, Mettupalayam Range granted leave for 3 months from 15–8–1936 or date of relief.

21—7—36. T. R. Rajagopalan M.F.C. Trained Forester, Coimbatore North Division appointed to act as Ranger Seventh grade and posted Mettupalayam Range *vice* Ranger Mr. S. Sundaravaradachariar granted 3 months leave.

24—7—36. Mr. I. John, Satyamangalam Range, transferred to Pollachi Range. 2. Mr. U. Viruddachalam Pillai, Pollachi Range transferred to Punachi Range. 3. Mr. P. A. Venkataraman, Punachi Range transferred to Tunacadavu Range. 4. Mr. K. Venkataramana Rao, Tunacadavu Range transferred to Satyamangalam Range. 5. Pollachi Range may be placed in additional charge of the Ranger in charge of the Pollachi depot and No. 2 allowed to move first.

25—7—36. The posting of T. R. Rajagopalan, Madras Forest College Trained Forester to the charge of Mettupalayam Range and promotion to act as Ranger Seventh grade is cancelled. 2. Mr. C. R. Raghunathan on special duty attached to Tunacadavu Range, posted to Mettupalayam Range, *vice* Mr. S. Sundaravaradachari granted leave.

Ootacamund Circle.

5—5—36. Mr. K. V. Dhooma Shetty, Coonoor Range, granted leave for two months from date of relief by No. (2). 2. Mr. K. Sankaranarayana Rao, posted to Coonor Range, on expiry of his leave.

5—7—36. On return from leave, Ranger Mr. P. A. Madhavan posted to special duty, Nilambur.

8—7—36. Mr. K. Dhooma Shetty, granted extension of leave for one month from 27th July 1936.

20—7—36. Mr. K. Purushothama Rao, posted to Sigur Range, the Nilgiris Division, *vice* Mr. B. M. Coates proceeding on leave. 2. Mr. B. Krishna Rao to Sultan's Battery Range, Wynad division, in relief of Mr. P. K. Sankara Menon, Trained Forester.

8—7—36. Mr. K. Dhooma Shetty, granted extension of leave for one month from 27th July 1936.

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